IMPROVED RECIPROCATING WEIGHT EXERCISE APPARATUS

BACKGROUND OF THE INVENTION

[0001] This invention is related to weight resistance exercise apparatus. More particularly, it is directed to improvements to an exercise apparatus having reciprocating weights.

[0002] The present invention improves the type of exercise apparatus disclosed by the inventor in U.S. Pat. Nos 5,334,118 and 5,474,511. Those patents disclose exercise apparatus comprising a rigid rod with a sliding weight the movement of which is restrained along the length of the rod by coil springs at an end of the weight. The disclosed exercise apparatus embodiments have either a sliding handle or a stationary handle at the opposite end of each spring from the weight. Different muscle groups are exercised depending on how the apparatus is held and whether the handles are stationary or slidable.

[0003] The invention disclosed in those patents has some limitations. Exercises that call for one end of the apparatus being held against a vertical or horizontal surface while force is applied to a sliding handle are difficult to perform because the apparatus becomes unstable. Exercises that can be performed only with embodiments with sliding handles cannot be performed with embodiments with stationary handles, and visa versa. Also the difficulty in overcoming the resistance of the springs depends on the strength of the springs and the mass of the weight. A combination that is suitable for a strong person would be too difficult for a person with lessor strength. Conversely, a combination that is suitable for a person with lesser strength would be too easy for a strong person. These patents did not allow for changing the weights without a disassembly of the apparatus.

SUMMARY OF THE INVENTION

[0004] The invention is a reciprocating weight exercise apparatus comprising a rigid tube with a weight contained between two coil springs that can slide along the length of the rod. There is a slidable handle seated on a sleeve with a swaged end exterior to each spring that can compress the adjacent spring. A stationary handle covers

each end of the tube. These tube ends are swaged to prevent a stationary handle from leaving the apparatus. Because the present invention has both stationary and slidable handles, exercises requiring either type of handle can be performed with one embodiment rather than two, as in the patents cited above. To protect a stationary handle from shock should a user suddenly let go of a slidable handle when the adjacent spring is compressed, there are shock absorbing means between a stationary handle and a slidable handle. Depending on the strength of the coil springs, the shock absorber means are a bushing and either an O-ring and or a spring. A user can hold one end of the tube against a surface by grasping the stationary handle at the other end of the tube with one hand while manipulating a slidable handle with the other hand. Thus the invention is a stable apparatus when performing exercises with one end of the rod held against a wall.

[0005] The weight may be threaded so that auxiliary weights can be attached to it. This variable weight capability gives the apparatus greater versatility without requiring partial disassembly to change weights. The additional mass of the auxiliary weights gives greater momentum to the weight when the apparatus is moved back and forth longitudinally. This greater momentum allows a user with lesser strength to do exercises with the same apparatus unit as a user with greater strength without need to changing the springs.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS

[0006] FIG. **1** is an illustration of a reciprocating weight exercise apparatus of the present invention.

[0007] FIG. **2** is a view of a swaged end of the tube of a reciprocating weight exercise apparatus.

[0008] FIG. **3** shows the auxiliary weights threaded onto the permanent weight.

[0009] FIG. **4** shows an embodiment with springs as shock absorbing means.

[0010] FIG. **5** is an exploded view of the apparatus.

DETAILED DESCRIPTION OF THE INVENTION

[0011] The embodiment illustrated in FIG. **1** has a rigid tube **10** with two ends. The tube can be made of steel, iron, aluminum, or such other material that can provide lightness and sufficient strength so that the tube is rigid when in use. The tube typically has an outer diameter of 3/4 inch with an inner diameter of 5/8 inch, except near its ends where the outer diameter is expanded, or swaged, to an outer diameter of 7/8 inch as shown in FIG. **2**. The inventor in U.S. Pat. No. 6,228,002 describes a method for swaging[1]. A permanent metal weight **20** slides on the tube. Typically, weights of one, two, three, or five pounds are used. There is a coil spring **30** and **35**, respectively on each lateral side of the weight. The coil springs typically have a strength 20 pounds when fully compressed. There are slidable handles **40** and **45**, respectively, outside of the coil springs. The handles can be made of rubber, vinyl, or another material that provides a good grip. Outward movement of a slidable handle is limited by an O-ring **50** and **55**, respectively, a metal bushing **60** and **65**, respectively, and swaged ends **70** and **75**, respectively of tube **10**. Affixed to the swaged ends of the tube are stationary handles **80** and **85**, respectively. The O-rings help quiet use by preventing noisy metal-to-metal contact and provide some cushioning.

[0012] With reference to FIG. **3** , weight **20** may have a threaded surface **21** onto which auxiliary weights **22** and **24** are attached. These auxiliary weights are annular with their inner surface **23** and **26**, respectively, threaded and with an inner diameter greater than the outer diameter of other components of the apparatus. The auxiliary weights can then be moved inward toward the permanent weight and attached to the permanent weight without touching the other components of the apparatus. FIG. **3** shows threaded interior surface **26** of auxiliary weight **24**. When the auxiliary weights are used, they should be threaded as far as possible on the permanent weight so that they are in contact with each other. This contact causes the auxiliary weights to lock together and prevents them from unthreading and falling off the permanent weight.

[0013] For the apparatus to be challenging to a strong user, coil springs offering more than 20 pounds of resistance should be used. A stronger coil spring requires a more substantial shock absorbing system than is provided by an O-ring and a bushing. FIG. 4

shows an embodiment wherein the O-rings are replaced by shock absorbing springs **90** and **95**, respectively. FIG. **4** also shows auxiliary weights **22** and **24** threaded onto permanent weight **20**. The auxiliary weights can also be used in the embodiment shown in FIG. **1** that has O-rings. Each slidable handle fits on a sleeve **41** and **46**, respectively, that has a swaged outer end **42** and **47**. The sleeve allows a handle to slide on the tube. A washer **43** and **48**, respectively, with an inner diameter less than the outer diameter of the sleeve where swaged keeps a slidable handle securely affixed to a sleeve. A second washer **32** and **37**, respectively, is disposed between a coil spring and a slidable handle to prevent the coil spring and the slidable handle from coming in contact. The exploded view in FIG. **5** shows the sleeves and washers.

[0014] To use the device, a user grasps each handle and moves the tube back and forth in a direction parallel to its length. This motion causes the weight to slide back and forth along the length of the tube. The weight compresses the spring in the direction the weight is traveling causing a resistive force, which increases as the compression of the spring increases. Finally, the force exerted on the weight by the compressed spring together with the force exerted by the user is sufficient to stop the weight and reverse its direction. The same effect then takes place at the opposite side of the apparatus. The springs act to dampen the sliding motion of the weight to make the resistance or force felt by the user substantially uniform and substantially limiting the occurrence of any jarring or percussive forces. The amount of movement along the tube by the weight depends on the mass of the weight, spring strength, and the force exerted by the user. The greater the force exerted by the user and the mass of the weight, the greater the momentum imparted to the weight and the further it can travel before being slowed by the compressive force of the spring. The combination of the force exerted by the user to slide the weight and the resistance provided by the springs provides the physical conditioning benefits to the user. For a user who can exert only limited force to reap maximum benefit from exercise with the apparatus a heavier weight is needed than for a person who can exert more force. The outer surface of weight **20** can be threaded and auxiliary weights **22** and **24** threaded onto weight **20** to provide this heavier weight.

[0015] Many types of exercises can be performed with the present apparatus. The muscle groups exercised depend on the angle of inclination of the tube, the position of the tube relative to the body, the amount of weight used, the tension of the springs, and which handles the user grasps. The apparatus can be held horizontally at several heights, such as above the head, shoulder height, or waist height. It can be used in a vertical direction , or at any angle between vertical and horizontal when one end is held at a higher elevation than the other hand. The apparatus can also be used in a sitting or lying position.

[0016] Exercises can be performed with one end of the apparatus, say stationary handle **85**, being placed against a hard vertical or horizontal surface. The user grasps the stationary handle at opposite end of the apparatus **80** with one hand to hold the apparatus in place while using the other hand to grasp either slidable handle and compress a spring. The user can also use both hands to grasp the slidable handles **40** and **45** and compress springs **30** and **35** simultaneously. The exercises that are described here are only a subset of the exercises that are possible with the present apparatus. Other exercises will become apparent to a user after use of the apparatus.